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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/728,132

12/04/2003

Peter J. Hopper

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8876

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LAW OFFICES OF MARK C. PICKERING  
P.O. BOX 300  
PETALUMA, CA 94953

EXAMINER

NHU, DAVID

ART UNIT

PAPER NUMBER

2818

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

12/22/2006

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/728,132	<b>Applicant(s)</b> HOPPER ET AL.	
	<b>Examiner</b> David Nhu	<b>Art Unit</b> 2818	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 27 October 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) 16-24 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 and 25-29 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.



#### Attachment(s)

- |                                                                                      |                                                                   |
|--------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____                                                          | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTIONS

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

2. Claims 1-15, 25-29 are rejected under 35 U.S.C. 102(e) as being anticipated by Yamaguchi et al (6,525,375 B1).

**Regarding claim 1**, Yamaguchi, (see figures 14A, 14B, 15, 16A, 16B, 17, col. 16, lines 1-62), teaches a transistor comprising: a first region 52 of a first conductivity p-type; a second region 1' of a second conductivity n-type that lies over the first region; a third region 2 of the first conductivity p-type that contacts the second region, the third region being spaced apart from the first region; and a fourth region 26, 27 of the second conductivity n-type that contacts the third region, the fourth region being spaced apart from the second region (see figure 17).

Regarding claim 2, Yamauchi, (see figures 15, 17), also teaches a trench 5 extends from a top surface of fourth region through fourth region, the third region, and partially into second region; a layer of insulation material 6 that contacts the trench; and a conductive gate region 7 that contacts the layer of insulation material and fills the trench.

Regarding claims 3, Yamaguchi, (see figures 15, 17), teaches the conductive gate region 7 is a region of doped polysilicon.

Regarding claim 4, Yamaguchi, (see figures 15, 17), teaches the first, second, third, and fourth regions have a crystallographic orientation.

Regarding claims 5, 6, Yamaguchi teaches a plug 7 that is formed through the first region to contact the second region (see figures 1); wherein the plug is metallic.

Regarding claims 7, 14, Yamaguchi, (see figures 15, 17), teaches a layer of isolation material that contacts a top surface of the fourth region, the layer of insulation material 6, and the conductive gate region 7; a gate contact formed through the layer of isolation material to make an electrical connection with the conductive gate region; and a drain 27 contact formed through the layer of isolation material to make an electrical connection with the fourth region .

Regarding claims 8, Yamaguchi, (see figures 15, 17), teaches an isolation layer that contacts the first and second regions.

Regarding claim 9, Yamaguchi, (see figures 15, 17), teaches a plurality of trenches 5 that extend from a top surface of fourth region through the fourth region, the third region, and partially into second region; a plurality of insulation layers 6 that contact the plurality of trenches such that each trench has an insulation layer; and a plurality of conductive gate regions 7 that contact the plurality of insulation layer and fill up the trenches .

Regarding claim 10, Yamauchi teaches the plurality of conductive gate regions 7 are regions of doped polysilicon.

Regarding claim 11, Yamaguchi, (see figures 15, 17), teaches the first, second, third, and fourth regions have a crystallographic orientation.

Regarding claims 12, 13, Yamaguchi, (see figures 15, 17), teaches a plug that is formed through the first region to contact the second region, wherein the plug is metallic.

Regarding claim 15, Yamauchi, (see figures 15, 17), teaches an isolation layer that contacts the first and second regions .

Regarding claims 25-29 Yamaguchi, (see figures 15, 17), teaches the isolation layer lies between the first and second regions, and is spaced apart from the plurality of insulation material 6, the third region, and the fourth region m, wherein the plug 7 is conductive and lies below two or more the plurality of trenches 5.; the plug 7 is conductive and spaced apart from the insulation material layer.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claim 1 is rejected under 35 U.S.C. 102 (b) as being anticipated by Andoh (6,639,301 B2).

**Regarding claim 1**, Andoh, (see figure 6, col. 17, lines 27-67), teaches a transistor comprising: a first region 34 of a first conductivity n-type; a second region 13 of a second conductivity p-type that lies over the first region; a third region 15 of the first conductivity n-type that contacts the second region, the third region being spaced apart from the first region; and a fourth region 12 of the second conductivity p-type that contacts the third region, the fourth region being spaced apart from the second region .

### **Conclusion**

5. The reference of Kawase's 1533 A1 is an error.

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Sakakibara'673 is cited as of interest.
7. A shortened statutory period for response to this action is set to expired 3 (three) months and 0 (zero) day from the date of this letter. Failure to respond within the period for response will cause the application to become abandoned (see 710.02 (b)).
8. Any inquiry concerning this communication on earlier communications from the examiner should be directed to David Nhu, (571)272-1792. The examiner can normally be reached on Monday-Friday from 7:30 AM to 5:00 PM. *The fax phone number for the organization where this application or proceeding is assigned is (571)273-8300.*

*Information regarding the status of an application may be obtained from the patent application information retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).*

David Nhu



December 15, 2006